Supplement: Dental Forensic Data

This is a Supplement to the *ANSI/NIST-ITL 1-2011* standard. It is focused upon forensic dental and oral data, incorporated into a new record type – Record Type-12. The Supplement also includes modifications to Type-10 image records to transmit images of suspected pattern injuries of intraoral origin and suspect latent images of perioral or intraoral origin. It also extends the Type-10 record capabilities to include x rays and other diagnostic images or a body.

Although Type-10, Face, other body part, or scar, mark, tattoo (SMT) image records can contain images of any body part, it is highly recommended that images of the oral region be conveyed in a Type-12 record.

Record Type-21, Associated Context record, which exists in *ANSI/NIST-ITL 1-2011,* may be used to transmit images on objects, of suspected perioral or intraoral origin. Data concerning casts and molds of impressions in skin or objects, and the locations of those casts and molds may also be transmitted in Record Type-21.

Part 1 of this Supplement expands the capabilities of the standard by including a new Record Type-12. This new record type is designed to accommodate oral biometric and forensic odontology data based upon the *ANSI/ADA Specification No. 1058* and *ANSI/ADA Specification No. 1067*. It facilitates the exchange of data to agencies that may use different data storage and/or matching systems.

This supplement addresses several types of dental and oral forensic information that may be contained in a Type-12 record:

- Disaster Victim Identification and Unknown Deceased Identification
  - Prior data (antemortem)
  - Current data (postmortem)

- Living Amnesiac Identity Verification
  - Prior data (antemortem)
  - Current data (antemortem)

- Dental and Oral Data from comparison candidates --- for cases involving pattern injuries of possible intraoral origin and/or latent image of possible perioral origin. The transmission of such dental and oral data concerning a comparison candidate to an agency does not imply that the pattern injury or latent image has been confirmed to be of intraoral or perioral origin by any agency or organization.
  - Current data (may be either antemortem or postmortem)

In the first case, (which is the most common use of Type-12 record) separate Type-12 records are generated for the prior and for the current data. Likewise, separate Type-12 records are created for prior and current data for a living amnesiac. Data elements are included in the Type-12 record to clearly

distinguish the timeframe of the data collection from the subject of the transaction.

Part 2 of this Supplement extends the Type-10 record in the *ANSI/NIST-ITL 1-2011* standard to handle images of pattern injuries on an individual of possible intraoral origin and latent images of possible perioral origin on an individual. Since Type-10 records only deal with images of a person, images of patterns on objects that could be of intraoral or perioral origin shall be transmitted in a Type-21 record.

The Type-10 record is also updated to allow for the transmission of more types of images. It had been able to handle black and while as well as color images. That capability is extended to include x-rays, sonograms, MRI images and other imaging types. This change has implications for other record types, such as Type-20, as addressed in Part 2.

Note also that a Type-10 record does not include data about non-images that may be associated with forensic analysis of pattern injuries, such as cast molds of indentations in the skin or of torn tissue. Data concerning such casts and molds shall be transmitted in a Type-21 record, as discussed in Part 4 of this Supplement.

Part 3 of this Supplement updates additional portions of the *ANSI/NIST-ITL1-2011* standard to reflect the changes in Parts 1 and 2, including

Section 3	**Normative References**
Section 4	**Terms and Definitions**
Section 5.3	**Record Types**
Annex B	**Traditional Encoding**
Annex C	**NIEM-conformant Encoding Rules**
Annex G	**Mapping to the NIEM IEPD**

In addition, a sample XML representation of the new Type-12 record is included in **Part 3.**

Part 4 of this Supplement provides a brief introduction as to how the Type-12 record may be used in conjunction with the other *ANSI/NIST-ITL 1-2011* record types as part of a process to identify unknown deceased (such as in a Disaster Victim Identification operation). These techniques may also be applied to identify or verify the identity of living amnesiacs.

Note: As a new record type, it is recommended that the encoding be done in XML, as opposed to Traditional encoding.

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Part 1

Part 1 defines the new Type-12 record added to the *ANSI/NIST-ITL 1-2011* standard. It is used to convey dental and oral data and images that may be useful in verifying or establishing the identity of an individual.

Section 8.12 of the *ANSI/NIST-ITL 1-2011* standard is updated as follows:

The Type-12 record shall contain and be used to exchange information that may be used to identify or confirm the identity of persons using dental biometrics and forensic odontological procedures. It is consistent with the *Forensic Dental Data Set, Specification Number 1058* of the American Dental Association (ADA) and uses the tooth numbering system stated in ANSI/ADA *Designation System for Teeth and Areas of the Oral Cavity, Specification 3950*[1].

For identification of unknown deceased, as noted by the ADA in Section **6** of Specification Number 1058: The antemortem forensic data set should consist of:

- familial data set
- dental history data set
- tooth data set
- mouth data set
- visual image data set
- radiographic image data set

The postmortem forensic dental data set should consist of 4 components:

- tooth data set
- mouth data set
- visual image data set
- radiographic image data set.

Each of these data sets directly corresponds to a field in the Type-12 record. There are also additional fields in the Type-12 record that may assist in the identification of individuals.

For living amnesiac cases, the same sets of data apply but the first group should be viewed as 'prior' and the second grouping as 'current.' For cases involving the transmission of dental and oral data about an individual for potential law enforcement purposes, the most current data on that individual should be supplied in a Type-12 record.

It is important to emphasize that lack of codes in ADA data set fields contained in a transaction using this ANSI/NIST-ITL standard does NOT mean that a condition is NOT present, but simply that the sender did not convey the information.

[1] This is not the numbering system commonly used in the United States, called the Universal / National System.

Table 2

Type-12 record layout

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	MIn #	Max #		MIn #	Max #
12.001		**RECORD HEADER**	M	encoding specific: see **Annex C; NIEM-conformant encoding rules**			**encoding specific: see Annex C; NIEM-conformant encoding rules**	1	1
12.002	**IDC**	**INFORMATION DESIGNATION CHARACTER**	M	N	1	2	0 ≤ IDC ≤ 99 integer	1	1
12.003	**FDS**	**FORENSIC DENTAL SETTING**	O					0	1
	FAT	forensic analyst type	M⇑	A	1	1	FAT = M,D,A,T, or O	1	1
	FPOC	forensic point of contact	O⇑	U	1	1000	none	0	1
	FACC	forensic analysis country code	O⇑	AN	2	3	Value from *ISO-3166-1*	0	1
12.004	**SRC**	**SOURCE AGENCY / SRC**	M	U	1	*	none	1	1
12.005	**DCO**	**DATA COLLECTION ORGANIZATION**	O	U	1	*	none	0	1
12.006	**SDI**	**SUBJECT DONOR INFORMATION**	M					1	1
	SIDC	status of individual at data collection	M	N	1	1	SIDC = 0 or 1 or 2	1	1
	SDLC	subject - date of last contact	O	AN	**3**	**9**	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year,M month, D day	0	1
	SDOB	subject's date of birth	O	AN	**3**	**9**	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year,M month, D day	0	1
	SEGP	subject's ethnic group	O	U	1	50	none	0	1
	SDRA	subject DNA records available	O	N	1	1	DRA = 0, 1 or 2 integer	0	1
	SSCL	subject's sample collection location	O	U	1	4000	none	0	1
	SDTD	subject's date and time of death	O	AN	**3**	**15**	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year,M month, D day, h hour, m minute	0	1

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	Min #	Max #		Min #	Max #
12.007	**OCSI**	**ORIGINAL SYSTEM CODING INFORMATION**	D					1	1
	OCN	original coding name	M⇑	A	4	6	OCN = EDRS, FastID, NamUS, NCIC, NEMA, PLASS, UDIM, WinID, Other or None	1	1
	OCV	original coding version	D	U	1	5000	None	0	1
	OCPD	original coding of permanent - deciduous	M⇑	N	1	1	OCPD = 0, 1, 2 or 3	1	1
	OCRM	original coding of restoration and material	M⇑	N	2	2	OCRM = 11,21,31,41,51 or 99	1	1
12.008	**TCSI**	**TRANSMITTAL CODING SYSTEM INFORMATION**	D					0	1
	TCN	transmittal coding name	M⇑	A	4	6	TCN= FastID, NCIC, PLASS, UDIM, WinID, or OTHER	1	1
	TCV	transmittal coding version	D	U	1	100	None	0	1
	TCPD	transmittal coding of permanent - deciduous	M⇑	N	1	1	TCPD = 0, 1, 2 or 3	1	1
	TCRM	transmittal coding of restoration and material	M⇑	N	2	2	TCRM = 11,21,31,41,51 or 99	1	1
12.009	**FDS**	**FAMLIAL DATA SET**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	*
	FRC	familial reference code	M⇑	NS	3	30	Valid code from *ANSI/ADA Specification No. 1058*, Section 7 (integers and periods are in the codes)	1	1
	FDT	familial descriptive text	D	U	1	5000	None	0	1
12.010	**DHD**	**DENTAL HISTORY DATA SET**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	*
	DHC	dental history reference code	M⇑	NS	3	30	Valid code from *ANSI/ADA Specification No. 1058*, Section 8 (integers and periods are in the codes)	1	1
	DHT	dental history descriptive text	D	U	1	5000	None	0	1

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	Min #	Max #		Min #	Max #
	TDS	**TOOTH DATA SET**	D					0	1
		Subfields: Repeating sets of information items	M⇑					1	*
12.011	TDI	tooth date of information	M⇑	N	2	15	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year,M month, D day, h hour, m minute	1	1
	TNU	tooth number	M⇑	N	2	2	Tooth numbers chosen from *ANSI/ADA Specification No. 3950*	1	1
	TOSC	tooth original system coding	D	A	1	300	none	0	1
	TACC	tooth ADA condition code	M⇑	NS	1	*	Valid codes from *ANSI/ADA Specification No. 1058*, Section 9 separated by commas (integers and periods are in the codes)	1	1
	TTSC	tooth transmitting system coding	O⇑	A	1	300	none	0	1
	TNCI	tooth number certainty indicator	O⇑	N	1	1	TNCI = 0, 1 or 2	0	1
	TDT	tooth descriptive text	D	U	1	5000	none	0	1
12.012	**MDS**	**MOUTH DATA SET**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	*
	MDD	mouth data date	M⇑	N	3	9	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year, M month, D day	1	1

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	Min #	Max #		Min #	Max #
	MRC	mouth reference code	M⇑	ANS	1	1	Valid code from *ANSI/ADA Specification No. 1058*, Section 10 (integers and periods are in the codes) Values beginning with P from **Table 3** are also valid.	1	1
	MDT	mouth descriptive text	D	U	1	5000	None	0	1
12.013	**VIS**	**VISUAL IMAGE DATA SET**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	*
	VID	visual image date	M⇑	N	3	9	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year, M month, D day	1	1
	VIG	visual image geolcation	O⇑	U	1	1000	none	0	1
	VIRC	visual image reference code	M⇑	NS	4	30	Valid code from *ANSI/ADA Specification No. 1058*, Section 11.2 (integers and periods are in the codes)	1	1
	VIDT	visual data descriptive text	O⇑	U	1	5000	none	0	1
	Note: At least one of the following <u>two</u> information items must be present in a subfield. Both may be present in a subfield.								
	VIDD	visual image digital data	D	B	1	*	Base64 data	0	1
	VIEF	visual image external reference	D	U	1	*	none	0	1
	VIFT	visual image file type	O⇑	U	1	100	none	0	1
12.014	**RIDS**	**RADIOGRAPH IMAGE DATA SET**	O					0	1
	RID	radiograph image date	M⇑	N	3	9	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year, M month, D day	1	1

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	Min #	Max #		Min #	Max #
	RGS	radiograph size	M⇑	NS	1	9	Valid code from *ANSI/ADA Specification No. 1058*, Section 12.5 (integers and periods are in the codes)	1	1
	RIS	radiograph image series	M⇑	NS	1	12	Valid code from *ANSI/ADA Specification No. 1058*, Section 12.6 (integers and periods are in the codes)	1	1
	RIIS	radiograph image in series	M⇑	U	1	50	none	1	1
	RICD	radiograph image capture date	O⇑	N	3	9	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year, M month, D day	0	1
	RPRI	radiograph practitioner information	O⇑	U	1	500	none	0	1
	Note: At least one of the following two information items must be present in a subfield. Both may be present in a subfield.								
	RIDD	radiograph image digital data	D	B	1	*	]Base64 data	0	1
	RIER	radiograph image external reference	D	U	1	*	none	0	1
	RIFT	radiograph image file type	O⇑	U	1	100	none	0	1
12.015	**NEMA**	**NEMA DICOM DATA**	O					0	1
	DIV	DICOM version	M⇑	AN	1	20	none	0	1
	DRD	DICOM data retrieval date	M⇑	N	3	9	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year, M month, D day	1	1
	Note: At least one of the following two information items must be present in a subfield. Both may be present in a subfield.								
	DICD	DICOM data	D	B	1	1	Base64 data	0	1
	DEF	DICOM external reference	D	ANS	1	*	None	0	1
12.016 – 12.019		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						
12.020	**COM**	**COMMENT**	O	U	1	126	none	0	1
12.021 – 12.199		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						
12.200 – 12.900	**UDF**	**USER-DEFINE FIELDS**	O	user-defined			user-defined	user-defined	

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	Min #	Max #		Min #	Max #
12.901		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						
12.902	**ANN**	**ANNOTATION INFORMATION**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	*
	GMT	Greenwich mean time	M⇑	encoding specific: see Annex B or Annex C			encoding specific: see Annex B or Annex C	1	1
	NAV	processing algorithm name / version	M⇑	U	1	64	none	1	1
	OWN	algorithm owner	M⇑	U	1	64	none	1	1
	PRO	process description	M⇑	U	1	255	none	1	1
12.903 – 12.992		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						
12.993	**SAN**	**SOURCE AGENCY NAME**	O	U	1	125	none	0	1
12.994		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						
12.995	**ASC**	**ASSOCIATED CONTEXT**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	255
	ACN	associated context number	M⇑	N	1	3	1 ≤ ACN ≤ 255 integer	1	1
	ASP	associated segment position	O⇑	N	1	2	1 ≤ ASP ≤ 99 positive integer	0	1
12.996		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						
12.997	**SOR**	**SOURCE REPRESENTATION**	O					0	1
		Subfields: Repeating sets of information items	M⇑					1	255
	SRN	source representation number	M⇑	N	1	3	1 ≤ SRN ≤ 255 positive integer	1	1
	RSP	reference segment position	O⇑	N	1	2	1 ≤ RSP ≤ 99 positive integer	0	1
12.998	**GEO**	**GEOGRAPHIC SAMPLE ACQUISITION LOCATION**	O					0	1
	UTE	universal time entry	O⇑	encoding specific: see **Annex B** or **Annex C**			encoding specific: see **Annex B** or **Annex C**	0	1
	LTD	latitude degree value	D	NS	1	9	-90 ≤ LTD ≤ 90	0	1

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	Min #	Max #		Min #	Max #
	LTM	latitude minute value	D	NS	1	8	0 ≤ LTM < 60	0	1
	LTS	latitude second value	D	NS	1	8	0 < LTS < 60	0	1
	LGD	longitude degree value	D	NS	1	10	-180 ≤ LGD ≤ 180	0	1
	LGM	longitude minute value	D	NS	1	8	0 ≤ LGM < 60	0	1
	LGS	longitude second value	D	NS	1	8	0 < LGS < 60	0	1
	ELE	elevation	O	NS	1	8	-422.000 < ELE < 8848.000 real number	0	1
	GDC	geodetic datum code	O	AN	3	6	value from **Table 6**	0	1
	GCM	geographic coordinate universal transverse Mercator zone	O	AN	2	3	one or two integers followed by a single letter	0	1
	GCE	geographic coordinate universal transverse Mercator easting	D	N	1	6	integer	0	1
	GCN	geographic coordinate universal transverse Mercator northing	D	N	1	8	integer	0	1
	GRT	geographic reference text	O	U	1	150	none	0	1
	OSI	geographic coordinate other system identifier	O	U	1	10	none	0	1
	OCV	geographic coordinate other system value	D	U	1	126	none	0	1
12.999		RESERVED FOR FUTURE USE only by ANSI/NIST-ITL	Not to be used						

8.12.1 Field 12.001: Record header

The content of this mandatory field is dependent upon the encoding used. See the relevant annex of this standard for details. See **Section 7.1.**

8.12.2 Field 12.002: Information designation character / IDC

This mandatory field shall contain the **IDC** assigned to this Type-12 record as listed in the information item **IDC** for this record in **Field 1.003 Transaction content / CNT** See **Section 7.3.1**

8.12.3 Field 12.003: Forensic dental setting / FDS

This optional field is used to describe the forensic setting that carried out the analysis of the dental and oral data to identify or confirm the identity of the subject. This field is not used when data is gathered and transmitted without forensic analysis. The field is comprised of the following information items:

* The first information item is the **forensic analyst type / FAT.** It is mandatory if this field is used. It contains a single letter describing the laboratory that processed the forensic data:

M	Medical examiner
D	Dental professional / Forensic odontologist
A	Forensic anthropologist
T	Technician
O	Other

- The second information item is the **forensic point of contact / FPOC** for the forensic analysis. This is an optional item. It should include the name, telephone number, and e-mail address of the person responsible for the analysis.

- The third information item is optional. It is the **forensic analysis country code / FACC.** This is the code of the location where the forensic analysis was performed, not the code of the location from which the forensic data or sample were sent for analysis. It is coded according to *ISO-3166-1*.

8.12.4 Field 12.004: Source agency / SRC

This is a mandatory field. See **Section 7.6** for details. The **SRC** is a code for a particular agency that is assigned by the implementation domain (such as NORAM, which is maintained by the FBI). It is often not a readable name. The source agency name may be entered in **Field 12.993: Source agency name / SAN**.

This field denotes the agency that prepared this record. It is not necessarily the agency that is transmitting this transaction (which is designated in **Field 1.008: Originating agency identifier / ORI**). It also need not be the agency that gathered the biometric samples and/or metadata. That organization (if different) is specified in **Field 12.005: Data collection organization / DCO**.

Note that changes and additions or subtractions to/from the original Type-12 record may be noted in **Field 98.900: Audit log / ALF**. Thus, when an agency updates a Type-12 record, **Field 12.004** is updated to reflect this new agency name and the previous value for **Field 12.004** is recorded in **Field 98.900.**

8.12.5 Field 12.005: Data collection organization / DCO

This field is optional. Note that this can be different from the agency entered in **Field 12.004: Source agency / SRC** and **Field 12.993 Source agency name / SAN**. **SRC** and **SAN** describe the agency that created the record. Since the record may have been forwarded by another agency to the final destination, **Field 1.008: Originating agency identifier / ORI** is used to indicate the transmitting organization. See **Section 7.6** for details about **SRC, SAN**, and **ORI**. For example,

- At a disaster recovery scene, *Local Response Team A* may have collected the data in the field. It would be entered in **DCO**. This name is usually different from the

original coding system name / OCSN in Field 12.008, since that refers to the coding convention used for the teeth.

- The data administration organization (such as *Disaster Recovery – Operation X*) would create the actual *ANSI/NIST-ITL 1-2011* conformant record. Such an organization's code would be entered in **Field 12.004: Source agency / SRC** (for example *NA54-X*) and its name in **Field 12.993 Source agency name / SAN** (for example *New Artichoke Regional Disaster Recovery Bureau)*. Note that this need not correspond to the **record creation coding system name / RCSN** in **Field 12.010,** since that refers to the coding convention used for the teeth.

- In many implementation domains, there are a limited number of transmission organizations that can send data. Therefore, the agency listed in **SRC** may send the transaction to another location that has access rights to the final destination. This intermediary may add information to the transaction, as well. The final transmitting organization code is listed in **Field 1.008: Originating agency identifier / ORI.** Its name may be entered in **Originating agency name /OAN** in **Field 1.017: Agency names / ANM.**

8.12.6 Field 12.006: Subject donor information / SDI

This field is mandatory. The first information item is mandatory. It closely corresponds to the information contained in Record Type-18 for DNA, **Field 18.006 Sample donor information / SDI**.

- The first information item is the **status of individual at data collection / SIDC**. It is an integer with one of the following values:

  0 = status of individual unknown
  1 = data obtained from a living person (for unknown deceased = antemortem)
  2 = data obtained from a decedent (for unknown deceased = post-mortem)

  Note that separate Type-12 records shall exist for antemortem and postmortem information.

- The second information item, **subject - date of last contact / SDLC** is optional. For example, in a missing person's case, it is the date that the person was last seen. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days. Note that categories are not limited to the calendar ranges (days 0 to 31 etc.). A valid example would be D45 to indicate 45 days.

- The third information item, **subject's date of birth / SDOB,** is an optional date field. This is particularly useful in missing person's cases. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days. Note

that categories are not limited to the calendar ranges (days 0 to 31 etc.). A valid example would be D45 to indicate 45 days.

- The fourth information item, **subject's ethnic group / SEGP,** is an optional string of 50 Unicode characters used to describe the ethnic group to which the subject belongs. This is not selected from a fixed list, since terminology that is useful in one area may not be relevant in another. For instance, in certain locations, if tribal membership (e.g. Zulu, Hopi) is known, it may be entered in this information item. In the United States, 'Hispanic' is a common term that may assist in identification, but that term would be meaningless (or simply cause confusion) in Guatemala or Spain. Likewise, 'aboriginal' describes people with very different physical characteristics in Australia and Taiwan – but it may be useful within those societies.

- The fifth information item is optional and indicates if DNA records are available for the subject. It is **subject's DNA records availability / SDRA**. This need not be specified if a Type-18 record is contained in the transaction, but it is highly suggested to do so. Allowed values are:

  0 = No
  1 = Yes
  2 = Unknown

- The sixth optional information item is the **subject's sample collection location / SSCL**. It is an optional string of up to 4000 Unicode characters. An example is "Lower jaw recovered 4.3 meters from the tip of the left wing of the airplane, in grid 4.3. Separated from skull. Four teeth found within 20 centimeters of the lower jaw." This may be a more descriptive entry than that of **Field 12.998, Geographic sample acquisition location / GEO**, which is typically the geographic location specified in GPS coordinates or with reference to a fixed landmark.

- The seventh item is optional but shall only appear if the subject is deceased and the data sample was collected postmortem. (**SIDC** = 2). It is the **subject's date and time of death / SDTD**. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}\mathbf{h}_{hh}\mathbf{m}_{mm}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days, **h** is hours and **m** is minutes and the superscripted or subscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days. Note that categories are not limited to the calendar ranges (days 0 to 31; minutes 0 to 59, etc.). A valid example would be h30 to indicate 30 hours. Also valid is an entry such as D02h05. Note that capital M is reserved for months and lower case m is reserved for minutes.

8.12.7 Field 12.007: Original coding system information / OCSI

This field is used to describe the data collection schema that was used for the original recordation of dental information. It is a mandatory field if **Field 12.011 Tooth data set / TDS** appears in this record. Otherwise this field shall not be present in the record. The **OCSI** need not be a forensic data system or a system capable of formulating an ANSI/NIST-ITL conformant record or transaction. The purpose of this field is to specify the rules and definitions that were used to specify the data originally.

- The first information item is mandatory. It is the **original coding name / OCN.** The code is selected from the following list:

EDRS	Electronic Dental Record System, conformant to *ANSI/ADA Specification No. 1067*
FastID	Interface for completing the INTERPOL Disaster Victim Identification forms[2]
NamUS	The National and Unidentified Persons System[3]
NCIC	The National Dental Image Repository of the National Crime Information Center (NCIC) run by the Federal Bureau of Investigation (FBI).[4]
PLASS	The DVI System International marketed by Plass Data Software A/S[5]
UDIM	The Unified Dental Identification Module (UDIM) of the Unified Victim Identification System (UVIS)[6]
WinID	Dental Identification System[7]
Other	The coding system is not listed but is formally documented
None	The ADA codes are selected and entered directly.

- The second information item is the **original coding version / OCV**. This item is optional unless 'Other' is specified for **OCN**. It is up to 5000 characters and specifies version of the data system that was used in the original coding (such as '2012 version' for UVIS/UDIM). If 'Other' is specified for **OCN**, this information is mandatory and specifies the coding system used, and the location of documentation for the coding system, such as a URL/URI.

- The third information item is the **original coding of permanent - deciduous / OCPD.** It is mandatory. It is used to designate the way that permanent and deciduous teeth are coded according the system used to enter the data. Possible values are:

  0 = Specified by tooth number (e.g. FastID, PLASS). For systems such as WinID and UDIM, which internally list the tooth number with a permanent tooth number but use a deciduous indicator, those two pieces of information shall be combined together to assign the tooth number according to *ANSI/ADA Specification No. 3950* prior to inclusion in this record.

  1 = Unable to determine if the teeth are permanent or deciduous at the tooth level but the system does allow a marker to indicate that deciduous teeth are present in the dentition (e.g. NCIC). The permanent tooth number shall be used.

  2 = Coding system incapable of distinguishing deciduous from permanent teeth (e.g. NamUS). The permanent tooth number shall be used.

  3 = Unknown whether the coding is capable of indicating deciduous and permanent teeth and / or whether the coding was performed using that capability. The permanent tooth number shall be used.

[2] Information is available at http://dvi-training.info/HTML/index.html
[3] Information is available at http://namus.gov/
[4] Information is available at http://www.fbi.gov/about-us/cjis/ncic/ncic
[5] Information is available at http://www.plass.dk/dok/dvi/DVIBrochure.pdf
[6] Information is available at http://www.nyc.gov/html/ocme/downloads/pdf/Special%20Operations/UVIS%20Information%20Guide_20090917.pdf
[7] Information is available at http://winid.com/index.htm

- The fourth information item is the **original coding of restoration and material / OCRM**. It is mandatory. This index indicates the type and level of restoration and surface information coded in **Field 12.011 Tooth data set / TDS**. The following values may be entered. Values 1-10, 12-20, 32-40, 42-50 and 52 through 98 are reserved for future use.

  11 = The system is capable of specifying individual restorations with the restored surface information and material composition coded separately for each restoration on the tooth; however, the submission of restorations with materials specified for each restoration is optional.

  21 = The system is capable of specifying individual restorations with the restored surface coded separately; however, all of the individual material compositions are combined into a single code for the tooth. Material specification is optional. Unknown material composition may be implicit or explicitly coded.

  31 = The system is capable of coding individual restorations with restored surfaces into a single code. All the materials utilized in all the restorations are combined into a single code when materials are represented. The codes are specified by tooth.

  41 = The presence of restorations without surface information is combined to a single code for the tooth. All materials utilized in all the restorations are combined to a single code for the tooth, when materials are represented.

  51 = Only the presence of restorations without surface or material information is included in the coding.

  99 = The level of detail contained in **Field 12.011** concerning restorations, materials and/or surfaces is unknown.

8.12.08 Field 12.008: Transmittal coding system information / TCSI

This field is mandatory only if the record creation data reference / encoding system is different from the original system and **Field 12.011 Tooth data set / TDS** appears in this record. This field is used to describe the encoding system that is associated with this record.[8]

If there is a chain of systems involved in creating the record, it is highly recommended that **Field 12.902: Annotation Information / ANN** be used to log the steps involved from origin to present state. Note that if the record creation organization wishes to transmit the information that was in **TCSI** as it was received from an intermediate organization (before modification), **Field 98.900: Audit log / ALF** allows for this possibility.[9]

[8] An example would be if data were sent form a source that used PLASS encoding to an agency that prepared the data for entry into WinID, transmitting an updated record to WinID. The original encoding can in this way be examined should there be a question about the meaning of the WinID code that was actually transmitted for a particular tooth.

[9] In **Field 98.900 EVT** would be coded Modified; **EVR** is "New record creation reference system"; **IID** is "IDC,12.009,NA,TCN" where IDC is the **IDC** specified in **Field 12.002** of this record; **AGT** is the new record creation organization; **OLD** is the value for **TCN** that was of the intermediate record creation coding system**.** Another subfield in **Field 98.900** may be created for each of the other information items in **Field 12.009** that is changed.

- The first information item is mandatory. It is the **transmittal coding name / TCN.** This system shall be capable of formatting an *ANSI/NIST-ITL 1-2011* conformant record and/or transmission. The code is selected from the following list:

FastID	Interface for completing the INTERPOL Disaster Victim Identification forms[10]
NamUS	The National and Unidentified Persons System[11]
NCIC	The National Dental Image Repository of the National Crime Information Center (NCIC) run by the Federal Bureau of Investigation (FBI).[12]
PLASS	The DVI System International marketed by Plass Data Software A/S[13]
UDIM	The Unified Dental Identification Module (UDIM) of the Unified Victim Identification System (UVIS)[14]
WinID	Dental Identification System[15]
Other	The coding system is not listed but is formally documented

- The second information item is the **transmittal coding version / TCV**. This item is optional unless 'Other' is specified for **TCN**. It is up to 5000 characters and specifies the version of the system that was used in the transmitted coding (such as '2012 version' for UVIS/UDIM). If 'Other' is specified for **TCN**, this information is mandatory and specifies the coding system used, and the location of documentation for the coding system, such as a URL/URI.

- The third information item is the **transmittal coding of permanent - deciduous / TCPD.** It is mandatory. It is used to designate the way that permanent and deciduous teeth are coded according the system used to enter the data. Possible values are:

  0 = Specified by tooth number (e.g. FastID, PLASS). For systems such as WinID and UDIM, which internally list the tooth number with a permanent tooth number but use a deciduous indicator, those two pieces of information shall be combined together to assign the tooth number according to *ANSI/ADA Specification No. 3950* prior to inclusion in this record.

  1 = Unable to determine if the teeth are permanent or deciduous at the tooth level but the system does allow a marker to indicate that deciduous teeth are present in the dentition (e.g. NCIC). The permanent tooth number shall be used.

  2 = Coding system incapable of distinguishing deciduous from permanent teeth (e.g. NamUS). The permanent tooth number shall be used.

  3 = Unknown whether the coding is capable of indicating deciduous and permanent teeth and / or whether the coding was performed using that capability. The permanent tooth number shall be used.

[10] Information is available at http://dvi-training.info/HTML/index.html
[11] Information is available at http://namus.gov/
[12] Information is available at http://www.fbi.gov/about-us/cjis/ncic/ncic
[13] Information is available at http://www.plass.dk/dok/dvi/DVIBrochure.pdf
[14] Information is available at http://www.nyc.gov/html/ocme/downloads/pdf/Special%20Operations/UVIS%20Information%20Guide_20090917.pdf
[15] Information is available at http://winid.com/index.htm

- The fourth information item is the **transmittal coding of restoration and material / TCRM**. It is mandatory. This index indicates the type and level of restoration and surface information coded in **Field 12.011 Tooth data set / TDS**. The following values may be entered. Values 1-10, 12-20, 32-40, 42-50 and 52 through 98 are reserved for future use.

  11 = The system is capable of specifying individual restorations with the restored surface information and material composition coded separately for each restoration on the tooth; however, the submission of restorations with materials specified for each restoration is optional.

  21 = The system is capable of specifying individual restorations with the restored surface coded separately; however, all of the individual material compositions are combined into a single code for the tooth. Material specification is optional. Unknown material composition may be implicit or explicitly coded.

  31 = The system is capable of coding individual restorations with restored surfaces into a single code. All the materials utilized in all the restorations are combined into a single code when materials are represented. The codes are specified by tooth.

  41 = The presence of restorations without surface information is combined to a single code for the tooth. All materials utilized in all the restorations are combined to a single code for the tooth, when materials are represented.

  51 = Only the presence of restorations without surface or material information is included in the coding.

  99 = The level of detail contained in **Field 12.011** concerning restorations, materials and/or surfaces is unknown.

8.12.09 Field 12.009 Familial data set / FDS

This optional field includes a subfield with a repeating set of information items. Each subfield has two mandatory information items. There may be multiple subfields. The information contained in this field may be unverified. The transmission of this information in no way indicates that the transmittal organization (or any other) has validated or even examined the data.

- The first information item is the **familial reference code / FRC.** It is mandatory. Any code value corresponding to the data set descriptors in Section **7** of the *ANSI/ADA Specification No. 1058* may be entered. An example is: **7.1.2** *for the First Name of the patient as it would appear on official (government) documents*.

- The second information item is the **familial descriptive text / FDT**. It is a Unicode free text information item with up to 5000 characters. It is used for those codes that require text, such as **7.1.11 Mobile Telephone Number** – *the last known area code and mobile telephone number used by the patient*. Other reference codes, such as **7.1.7.1 Male** – *used when the patient's legally recognized sex is known to be male*, would not have any information recorded in **FDT.**

8.12.10 Field 12.010 Dental history data set / DHD

This optional field should be included when prior data is available. This field includes a subfield with a repeating set of information items. Each subfield has two mandatory information items. There may be multiple subfields.

- The first information item is the **dental history reference code / DHC**. It is mandatory. Any code value corresponding to the data set descriptors in Section **8** of the *ANSI/ADA Specification No. 1058* may be entered. An example is **8.1.3.9.1.5** f*or the National Provider Identifier Number of Dentist that treated the patient*.

- The second information item is the **dental history descriptive text / DHT**. It is a Unicode free text information item with up to 5000 characters. It is used for those codes that require text, such as **8.1.1 Name of Practice** – *the full name of the practice where the patient was treated*. Other reference codes, such as **8.1.3.8.4 Chart Available** – *used when chart information is available from the practice where the patient was treated*, would not have any information recorded in **DHT.**

8.12.11 Field 12.011 Tooth data set / TDS

This optional field has subfields, each with a set of information items. There may be multiple subfields with the same tooth number. For transmittal coding systems that combine tooth conditions into a single subfield at the tooth level, one subfield is used per tooth. If information separately for conditions on a particular tooth, each condition shall be a separate subfield with the same tooth number, designated in **TNU**.

This field shall only appear if **Field 12.007: Original coding system information / OCSI** is present in the record. If the transmittal system uses different coding than that defined in **OCSI,** then **Field 12.008: Transmittal coding system information / TCSI** shall be present in the record.

All destination systems should be capable of receiving data relating to a single tooth in multiple subfields, even if tooth conditions in the destination system are expressed jointly at the tooth level. If a destination system is capable of expressing tooth conditions separately does receive information from a system that is not capable of expressing tooth conditions separately, that destination system should take care concerning the assignment of *ANSI/ADA Specification No. 1058* codes to individual conditions on the tooth.

For cases when there is no information about a tooth (e.g. even whether it was missing or present on the subject), there shall be no field entry. However, if it is known that a tooth was missing, the appropriate ANSI/ADA code should be represented, such as **9.3.2.2 - Missing not replaced** – *used regardless of the etiology of the lost (extracted, congenital, unknown) with the exception of the case where the tooth lost was believed to be an avulsion*, or **9.4.4.5.3 – Avulsion of Tooth** – *describing that a tooth has been forcefully exfoliated from its socket and the socket has exhibited virtually no healing, used only if there is substantial evidence that the loss was traumatic and not therapeutic or through natural causes*.

- The first information item is the **tooth date of information / TDI.** It corresponds to Section 9.2 of *ANSI/ADA Specification No. 3950.* It is mandatory. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days.

- The second information item is the **tooth number / TNU.** It is mandatory.

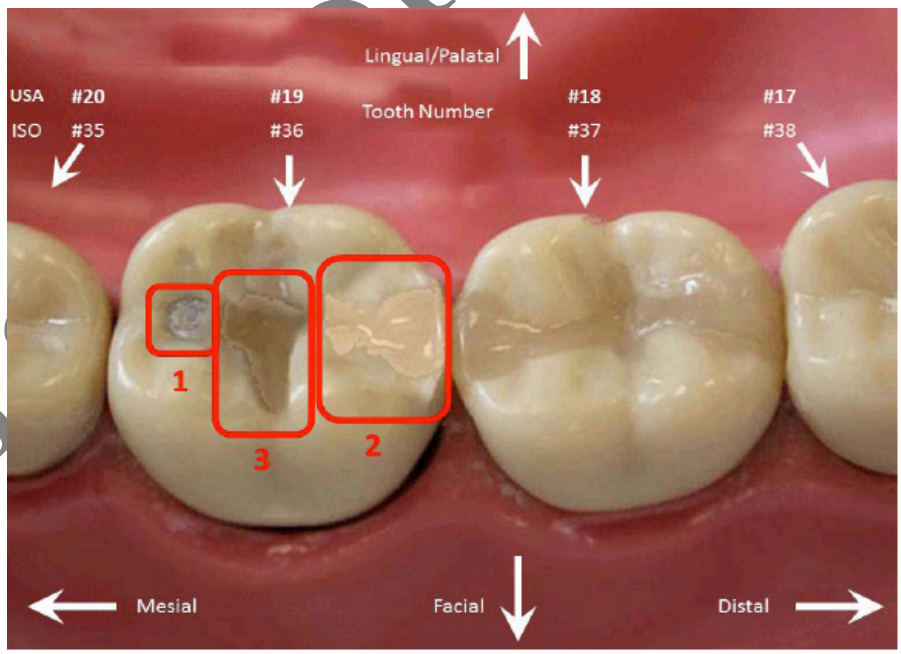
Teeth shall be numbered utilizing the permanent and deciduous teeth codes in *ANSI/ADA Specification No. 3950*[16]*,* shown in **Figure 1**. Note that if **OCPD** indicates that there is no distinction between deciduous teeth and permanent teeth in the original coding, the tooth shall be listed as permanent, even if the transmittal coding is capable of distinguishing between the two types of teeth. The analyst should be aware of this when reviewing the data.

[16] This numbering system is the same as in ISO 3950:2009 *Dentistry -- Designation system for teeth and areas of the oral cavity*.

Figure 1
Digital designation of the teeth and of the oral cavity
as specified in *ANSI/ADA Specification No. 3950*

Right																Left	
							00										Oral cavity
							01										Maxillary area
					10					20							Quadrant
			03				04					05					Sextant
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28		Permanent teeth
			55	54	53	52	51	61	62	63	64	65					Deciduous teeth
			85	84	83	82	81	71	72	73	74	75					Deciduous teeth
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38		Permanent teeth
			08				07					06					Sextant
					40					30							Quadrant
							02										Mandibular area

Figure 2
Simulated Restorations in Tooth 36 from a Demonstration Sample



The third information item is the **tooth original system coding / TOSC.** It is a Unicode field of up to 300 characters. It shall be entered unless **OCN** has a value of 'None' (representing that the coding was performed by using the codes of *ANSI/ADA Specification No. 1058* without specific reference to a dental forensic processing system's data restrictions).

A tooth with three restorations (as in **Figure 2**) may be described differently by various storage and comparison systems:

Plass : amf O cef DO tif O
Plass distinguishes each restoration and describes them individually.
The Plass coding is described as:
restoration 1 is an amalgam restoration (amf) in occlusal location (O)
restoration 2 is a composite restoration (cef) in distal - occlusal location (DO)
restoration 3 is a tooth colored restoration (tif) in occlusal location (O)
Note: This would be coded using three subfields.

UDIM: DO mAC
UDIM does not distinguish the number of restorations or describe them individually. The coding indicates the presence of restorations at the distal and occlusal locations (DO) and that the materials (m) are amalgam (A) and composite (C). UDIM has four code types: tooth surface status (required), restoration code - r (optional), condition code - c (optional), material code - m (optional).

WinID: DO ES
WinID does not distinguish the number of restorations or describe them individually. The coding indicates the presence of restorations at the distal and occlusal locations (DO). The fillings are listed as resin (E) and silver (S).

NCIC: DO
NCIC does not distinguish the number of restorations or describe them individually. The coding indicates the presence of restorations in the distal and occlusal locations (DO).

NamUs: F
NamUS does not distinguish the number of restorations or describe them individually. In addition, NCIC does not directly code the restoration composition, nor does NamUS describe which surfaces are restored. The coding only indicates the presence of a restoration.

- The fourth information item is the **tooth ADA condition code / TACC.** This information item is mandatory. Any code value in Section **9** of the *ANSI/ADA Specification No. 1058* may be entered. The *ANSI/ADA Specification No. 1058* coding system has a hierarchical arrangement so that codes with more nodes (represented by periods) provide greater specificity of the information concerning a characteristic. Note that if only general information is available, a code with fewer nodes may be entered, such as **9.3.2.5**, which corresponds to *present – restored*. If available information is more detailed, a code with more nodes should be entered, such as **9.3.2.5.1.3**, which indicates *present – restored; surfaces restored; distal*. The listing of a reference code indicates the presence of the characteristic.

TACC is a Unicode information item of up to 5000 characters. Several values can be entered for the

same tooth, being separated by commas[17]. The coding is order independent, so a code of 9.3.2.5.1.3 (Distal) followed by 9.3.2.5.1.2 (Occlusal) is treated identically to an entry of 9.3.2.5.1.2 (Occlusal) followed by a code of 9.3.2.5.1.3 (Distal). If the original system coding is very detailed but the transmitting system coding is at a summary (represented by codes with fewer nodes) level the mapping is straightforward. However, if the converse is true, care must be taken not to introduce 'false' information in the mapping of codes. Using the example for Figure *1*:

Plass : Three subfields describe the tooth.

In the first subfield, for the first condition (restoration 1) (amf O)
TACC = 9.3.2.5.1.2, 9.3.2.5.4.1
(present-restored, occlusal location)
(present-restored, amalgam material)

In the second subfield, for the second condition (restoration 2) (cef DO)
TACC = 9.3.2.5.1.3, 9.3.2.5.1.2, 9.3.2.5.4.2
(present-restored, distal location)
(present-restored, occlusive location)
(present-restored, composite/acrylic material)

In the third subfield, for the third condition (restoration 3) (tif O)
TACC = 9.3.2.5.1.2, 9.3.2.5.4.9
(present-restored, occlusal location)
(present-restored, other - by report) Note: 'By report' indicates that ***TDT*** *should explain that 9.3.2.5.4.9 here represents tooth colored filling. 9.3.2.5.4.9 is used since the composition of the restorative material is not specified in the code.*

UDIM: **TOSC** = O mAC
One subfield that describes the entire tooth:
TACC = 9.3.2.5.1.2, 9.3.2.5.4.1, 9.3.2.5.4.2
(present-restored, occlusal location)
(present-restored, amalgam material)
(present-restored, composite/acrylic material)

WinID: **TOSC** = O ES
One subfield that describes the entire tooth:
TADC = 9.3.2.5.1.2, 9.3.2.5.4.1, 9.3.2.5.4.2
(present-restored, occlusal location)
(present-restored, amalgam material)
(present-restored, composite/acrylic material)

NCIC: **TOSC** = O
One subfield describes the entire tooth:
TACC = 9.3.2.5.1.2
(present-restored, occlusal location)

NamUs: **TOSC** = F

[17] For ease of readability, a space may be inserted after the comma with no impact on the data.

One subfield that describes the entire tooth:
TACC = 9.3.2.5
(present-restored)

An example of how a person might code the tooth without reference to a particular system using the ANSI/ADA codes could be:

Two subfields with one describing the tooth.

In the first subfield, the restoration is described, but without a location.
TACC = 9.3.2.5.4.1
(present-restored, amalgam material)

In the second subfield, the other restorations are jointly described, again without location associated to the restorations on the tooth.
TACC = 9.3.2.5.4.9
(present-restored, other - by report) The analyst may have indicated in **TDT** that there are other restorations that appear to be non-metallic on the same tooth.

The fifth information item is the **tooth transmitted system coding/ TTSC.** This is important since the record creation systems may be different from the original system where the coding of the test first occurred. It is a Unicode information item of up to 3000 characters. For the examples above, the first subfield for Plass would be *amf O*; the second subfield would be *cef DO*, The entry for UDIM would be *O mAC*. Note that for **OSN** = 'None' in **Field 12.007: Original coding system information** and when **Field 12.008: Transmittal coding system information / TCSI** is not present in the record, there shall not be an entry in this information item. For all other codings, this information item is mandatory.

- The sixth information item is the **tooth number certainty indicator / TNCI.** This information item is optional. If it is not entered, a **TNCI** of 0 is assumed. Possible values are:

  0 Unspecified (the system does not have the capability of stating that there is uncertainty in the tooth number)
  1 Certain
  2 Uncertain

- The seventh information item is the **tooth descriptive text / TDT**. It is a Unicode free text information item with up to 5000 characters. It is used for those codes that require text, such as **9.3.2.5.3.1.1.5** – *restoration material / Other (by report) – used to describe a restoration material not described by other descriptors*. Other reference codes, such as **9.3.2.1.2.1.3 Type of Pontic / Resin** – *used for a pontic that is adhesive attached to adjacent teeth by an extra coronal partial coverage restoration of any material*, would not have any information recorded in **TDT.**

8.12.12 Field 12.012 Mouth data set / MDS

This optional field allows the entry of information concerning the mouth. For instance, periodontal disease may be noted, as may partial removable dentures. This field is comprised of two information items in a subfield.

- The first information item is the **mouth data date/ MDD.** It is mandatory. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days.

- The second information item is the **mouth reference code / MRC.** It is mandatory. Any code value in Section 10 of the *ANSI/ADA Specification No. 1058* may be entered. Note that if only general information is available, a high level number may be entered, such as **10.3.2.4**, which corresponds to *Maxillofacial Prosthesis*. If more detailed information is available, a lower level code should be entered, such as **10.3.2.4.1.1**, which indicates *Maxilla (The prosthesis is used to replace portions of the maxilla)*. The listing of a code indicates that the characteristic is present. If only general information is available, a code with fewer nodes may be entered, such as **10.3.2.2**. which corresponds to *Partial Removable Denture*. If available information is more detailed, a code with more nodes should be entered, such as **10.3.2.2.1**, which indicates *Kennedy Class I - This Descriptor is used to describe a removable prosthesis replacing teeth on both sides of the arch where no other teeth exist posterior to the edentulous area.*

This information item may also contain entries from the first column of the following table.

Table 3: Palatine Descriptors

	Dental Arch Shape
P.1.1	*Ovoid*
P.1.2	*Square*
P.1.3	*Triangular*
P.1.4	*Other*
	Rugae Ramification
P.2.1	*Linear*
P.2.2	*Branches*
	Rugae Shape
P.3.1	*Straight*
P.3.2	*Wavy*
P.3.3	*Curves*

P.3.4 *Round (circular)*

P.3.5 *Non-specific*

- The third information item is the **mouth descriptive text / MDT**. It is a Unicode free text information item with up to 5000 characters. It is used for those codes that require text, such as **10.3.5.1 Prosthetic / ID Data** – *used to describe any identifying Serial number on the appliance*. Other reference codes, such as **10.5.1.1.8.1 Cleft lip** – *used to indicate the non-union of the soft tissue of the lip*, would not have any information recorded in **MDT.**

8.12.13 Field 12.013: Visual image data set / VIDS

This optional field indicates that there is an image in this record and may be used to characterize the image. Multiple subfields may be used to handle several images.

Note that images of the body that do not correspond to one of the codes in Section **11.2** of the *ANSI/ADA Specification No. 1058* may be entered in a Type-10 record, with the appropriate entry selected for **Field 10.003 Image type / IMT**. If feature points are to be marked for an image, the image should be conveyed in a Type-10 record, and the appropriate markup field utilized (**Field 10.029 2D facial feature points / FFP** and / or **Field 10.032: 3D facial feature points / 3DF**). Feature points are specifically defined locations on the face that are used in forensic comparisons. The excerpt from Table 65 of ANSI/NIST-ITL 1-2011 describes just some of the feature points that can be marked on an image in a Type-10 record.

EXCERPT from

Table 65 ISO definitions of the anthropometric landmarks

Feature Point ID	MPEG4 Feature Point	Anthropometric Point Name	Description
v	11.4	vertex	The highest point of head when the head is oriented in Frankfurt Horizon.
g		glabella	The most prominent middle point between the eyebrows
op		opisthocranion	Situated in the occipital region of the head is most distant from the glabella
eu		eurion	The most prominent lateral point on each side of the skull in the area of the parietal and temporal bones
ft		frontotemporale	The point on each side of the forehead, laterally from the elevation of the linea temporalis
tr	11.1	trichion	The point on the hairline in the midline of the forehead
zy		zygion	The most lateral point of each of the zygomatic bones

- The first information item is the **visual image date / VID**. This corresponds to an entry for **11.1.1** in *ANSI/ADA Specification No. 1058* It is mandatory. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days.

- The second information item is the **visual image geolocation / VIG.** This optional item is a text field of up to 1000 characters and may contain the location in any format. This information items corresponds to the recommendation for geolocation information mentioned in **11.1.1** of the *ANSI/ADA Specification No. 1058*

- The third information item is the **visual image reference code / VIRC.** It is mandatory. Any code value in Section **11.2** of the *ANSI/ADA Specification No. 1058* may be entered. Note that only one value may be entered per subfield.

- The fourth information item is optional. It is the **visual image descriptive text / VIDT**. It is a Unicode free text information item with up to 5000 characters. It may be used with any code.

The third and/ or fourth information item shall be present in the subfield. There shall not be a subfield of this with neither of these information items present.

- The fifth information item is the **visual image digital data / VIDD**. It is a Base-64 representation of the image referenced in **VIRC.** See **Annex A** of *ANSI/NIST-ITL 1-2011*, **Section A.3: Base-64 encoding.** **VIDD** is used only for digitally stored images.

- The sixth information item is the **visual image external reference / VIER.** It is a text field of describing the external file. **VIER** may be used to convey the storage location of digital images (such as a URL/URI) or may also be used to indicate the physical storage location of an analog image. There shall be no conversion of digital images to hard copy analog prints for transmission.

- The seventh information item is the **visual image file type / VIFT.** It is optional, but should be used to describe the container or codec used to store the image (such as JPEG). This corresponds to **11.1.5** of the *ANSI/ADA Specification No. 1058.*

An example of this field is:

Subfield 1

VID = 20021104
VIG = Corner of Madison Avenue and 54th
VIRC = 11.2.1.1 (Extraoral – full face frontal)
VIER = https://www.localpdname.case54/image3.jpg

Subfield 2

VID = 20120305
VIG = 41° 50’ 9” N 91° 52’ 0” W
VIRC = 11.2.2.1 (Intraoral - frontal)
VIDT = front upper lip retracted, bottom lip partially missing, lower jaw broken and only

partially present
VIDD = digital image in Base 64
VIFT = TIFF

8.12.14 Field 12.014: Radiograph image data set / RIDS

As Section 12.4.6.2 of the *ANSI/ADA Specification No. 1058* states: "Ideally, images are transferred electronically to the requesting agency in DICOM format. If the requesting agency does not have software that can read the DICOM format directly, then a DICOM Viewer with basic image export feature should be provided."

DICOM formatted radiographs (and other DICOM data are transmitted using **Field 12.015**. This field (**RIDS)** is provided for the transmittal of radiograph images that may be from locations without access to DICOM or that do not use that system (such as many locations external to the United States). If this field is used, each radiograph image is described in a separate subfield. Digital radiographs may be transmitted in this field. For analog radiographs, the storage / retrieval location is indicated.

- The first information item is the **radiograph image date / RID**. This corresponds to an entry for **11.1.1** in *ANSI/ADA Specification No. 1058*. It is mandatory. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days.

- The second information item is the **radiograph size / RGS.** It is mandatory. Any code value in Section **12.5** of the *ANSI/ADA Specification No. 1058* may be entered. Note that only one value may be entered.

- The third information item is mandatory. It is the **radiograph image series / RIS**. It is mandatory and any code value in Section **12.6** of the *ANSI/ADA Specification No. 1058* may be entered.

- The fourth information item is mandatory. It is the **radiograph image in series / RIIS**. This is used to specify which individual image in a particular series is conveyed in this subfield. For example, if code **12.6.4.2.1** is selected (Two maxillary molar periapicals), this information item would specify 'right' for one Type-12 record and 'left' for another instance of Type-12. This is a text field of up to 50 characters.

- The fifth information item is optional. It is the **radiograph practitioner information / RPI.** This is a Unicode free text information item with up to 500 characters. It should contain the practitioner's name, address and telephone or other contact information, if different from that entered in the **Dental history data set / DHD.**

The sixth and/ or seventh information item shall be present in the subfield. There shall not be a subfield of this with neither of these information items present.

- The sixth information item is the **radiograph image digital data / RIDD**. It is a Base64

representation of the image**.** See **Annex A** of ANSI/NIST-ITL 1-2011**, Section A.3: Base-64 encoding. RIDD** is used only for digitally stored images

- The seventh information item is the **radiograph image external reference / RIER.** It is a text field of up to 125 characters describing the external file. **RIER** may be used to convey the storage location of digital images (such as a URL/URI) or may also be used to indicate the physical storage location of an analog image. There shall be no conversion of digital images to hard copy analog prints for transmission.

- The eighth information item is the **radiograph image file type / RIFT.** It is optional, but should be used to describe the container or codec used to store the image.

8.12.15 Field 12.015: NEMA DICOM data / NEMA

This is an optional field. It contains descriptions of data formatted according to the standard Digital Imaging and Communications in Medicine (DICOM) of the National Electrical Manufacturers Association. The data itself may also be included in this field.

- The first information item, **DICOM version / DIV,** is the version of the DICOM standard, such as 2011. It is mandatory.

- The second information item, **DICOM data retrieval date / DRD,** is the date of retrieval of the DICOM data for reference from this record. It is mandatory. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days and the superscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days.

The third and/ or fourth information item shall be present in the subfield. There shall not be a subfield of this with neither of these information items present.

- The third information item is the **DICOM data / DICD**. It is a Base64 representation of the data**.**

- The fourth information item is the **DICOM external reference / DER.** It is a text field of up to 125 characters describing the external file location.

8.12.18 Field 12.020: Comment / COM

This is an optional field. See **Section 7.4.4** for details.

8.12.19 Fields 12.200 through 12.900: User-defined fields / UDF

These fields are user-defined fields. Their size and content shall be defined by the user and be in accordance with the receiving agency.

8.12.20 Field 12.902: Annotation information / ANN

This is an optional field, listing the operations performed in order to prepare this biometric record type. If present, this field is comprised of subfields, each having four mandatory information items as described in **Section 7.4.1.**

8.12.21 Field 12.993: Source agency name / SAN

This is an optional field. It may contain up to 125 Unicode characters. It is the name of the agency referenced in **Field 12.004: Source Agency / SRC**.

8.12.22 Field 12.995: Associated context / ASC

This optional field refers to one or more Record(s) Type-21. An example of the use of this field would be to transmit an image of an unidentified body at the location where it was discovered. When present, this field is comprised of subfields. There is one mandatory information item and one optional information item per subfield, as described in **Section 7.3.3.**

8.12.23 Field 12.998: Geographic sample acquisition location / GEO

This optional field contains the location where the image(s) / sample(s) was acquired – not where it is stored. See **Section 7.7.3**. This information applies to the entire Record Type-12. If different locations are applicable for the images / samples / data then separate instances of Record Type-12 should be created and transmitted jointly in the same transaction.

Part 2

Part 2 adds new imaging capabilities to the Type-10 record. This record type has new image categories added to its capabilities in order to handle pattern injury images and latent images of possible perioral origin. As a result of some changes, there are secondary changes to some other record types- as described herein.

Part 2 Subpart 1: NEW IMAGE CATEGORIES

Type-10 records have been black and white or color still images in previous versions of the standard. The need to transmit different types of images has been recognized by the law enforcement and Disaster Victim Identification (DVI) communities, among others. Some individuals may be able to be identified through the use of X-rays that had been taken for diagnostic purposes. Other types of images used in the medical field may also be of potential service in the process of identifying an unknown deceased. Since **Field 10.012** is mandatory in the standard, this field is modified to accommodate these additional types of imaging. Although these new image types are not really 'color spaces' they are added to the codes that can be used in this field. The field name is not changed even though its effective use has been extended beyond 'color,' in order to maintain backward compatibility with earlier versions of the standard.

Section 8.10.12 of the *ANSI/NIST-ITL 1-2011* standard describes **Field 10.012** and refers to **Section 7.7.10** for details. Section **7.7.10** describes the use of **Table 16** (reproduced here for reference). In previous versions of the standard, this listing did not allow for X-rays, sonograms and other imaging techniques that may be useful in forensics, such as Disaster Victim Identification.

Table 16 Color spaces

Code	Description
UNK	Undefined
GRAY	Grayscale (monochrome)
RGB	Undetermined color space for an RGB image
SRGB	sRGB (*IEC 61966-2-1*)
YCC	YCbCr (legacy)
SYCC	YCbCr (JPEG 2000 compressed)

From *ANSI/NIST-ITL 1-2011* Section 7.7.10

This Supplement adds the following Codes and Descriptions to **Table 16**:

Code	Description
XRAY	X-Ray image
SONO	Sonogram image
MRI	Magnetic resonance image
OTHR	Other type of image

When OTHR is specified, the user should add a comment in the **Comment / COM** field describing the type of image. A typical comment may read : "Ultraviolet illumination and imaging of injury on human skin (postmortem)."

Several record types are affected by this table change (Type-10, Type-16, Type-17 and Type-20).

Section 8.10.12 Field 10.012: Color space / CSP is updated to read:
This is a mandatory field. See **Section 7.7.10** for details. All codes are valid for use in a Type-10 record.

Section 8.16.13 Field 16.013: Color space / CSP is updated to read:
This optional field shall be completed in accordance with **Section 7.7.10.3** if entered in a Type-16 record. All codes are valid for use in a Type-16 record.

Section 8.17.13 Field 17.013: Color space / CSP is updated to read:
This field is mandatory if an image is present in **Field 17.999** for an iris record. Otherwise it is absent. See **Section 7.7.10** for details. If **Field 17.025: Effective acquisition spectrum / EAS** is set to "NIR" this field shall be set to "GRAY". Other than "GRAY", only "SYCC," "UNK," "RGB" or "SRGB" are allowed entries in this field.

Section 8.20.13 Field 20.013: Color space / CSP
This field is mandatory if a 2D still image is contained in this instance of the record. Otherwise it shall be omitted. All codes are valid for use in a Type-20 record. See **Section 7.7.10.3** for details.

Subpart 2: NEW DATA FIELDS

Three new fields are added to the Type-10 record, as described below.

8.10.40a Field 10.046: Victim / VIC

This field is optional. If the image contained in this record is of a pattern injury or latent image on a person, this field is used to describe the victim. Note that **Field 10.041: SMT size or size of injury or identifying characteristic / SMS** should be used in conjunction with this field. This field is comprised of the following information items:

- The first information item is mandatory if this field is present. It is **victim current status / VCS.** Possible entries are:
  - Living
  - Deceased
  - Unknown

- The second information item shall be entered if **VCS** is deceased. It is **victim body status / VBS.** Its purpose is to indicate whether the information relates to an entire corpse or a separate body part. The value is selected from the descriptors below:

  Whole
  Part

8.10.40b Field 10.047: Data collection organization / DCO

This field is optional. Note that this can be different from the agency entered in **Field 10.004: Source agency / SRC** and **Field 10.993 Source agency name / SAN**. **SRC** and **SAN** describe the agency that created the record. Since the record may have been forwarded by another agency to the final destination, **Field 1.008: Originating agency identifier / ORI** is used to indicate the transmitting organization. See **Section 7.6** for details about **SRC, SAN**, and **ORI**. For example,

- At a disaster recovery scene, *Local Response Team A* may have collected the data in the field. It would be entered in **DCO**.

- The data administration organization (such as *Disaster Recovery – Operation X*) would create the actual *ANSI/NIST-ITL 1-2011* conformant record. Such an organization's code would be entered in **Field 10.004: Source agency / SRC** (for example *NA54-X*) and its name in **Field 10.993 Source agency name / SAN** (for example *New Artichoke Regional Disaster Recovery Bureau)*

- In many implementation domains, there are a limited number of transmission organizations that can send data. Therefore, the agency listed in **SRC** may send the transaction to another location that has access rights to the final destination. This intermediary may add information to the transaction, as well. The final transmitting organization code is listed in **Field 1.008: Originating agency identifier / ORI.** Its name may be entered in **Originating agency name /OAN** in **Field 1.017: Agency names / ANM.**

8.10.40c Field 10.048: Pattern injury or latent image description / PLID

This is a field that contains subfields. Each subfield is comprised of the following information items. Note that pattern injuries or latent prints on the body may have occurred at different times.

- The first information item, **pattern injury or latent print application lapse time to imaging / PLLT,** is optional. It is stated as $\mathbf{Y}^{yy}\mathbf{M}^{mm}\mathbf{D}^{dd}\mathbf{h}_{hh}\mathbf{m}_{mm}$ The **Bold** characters are part of the data representation, where **Y** is years, **M** is months, **D** is days, **h** is hours and **m** is minutes and the superscripted or subscripted letters indicate the positions of the actual data values corresponding to the time measurements. (The actual time category entries are not bold when entered as data) Higher and lower time categories than actually known may be left blank. An example is D04 to indicate 4 days. Note that categories are not limited to the calendar ranges (days 0 to 31; minutes 0 to 59, etc.). A valid example would be h30 to indicate 30 hours. Also valid is an entry such as D02h05. Note that capital M is reserved for months and lower case m is reserved for minutes.

- The second information item is optional. It is the **pattern injury or latent image timing**

determination / PLTD. It is selected from the following list:

antemortem
postmortem
unknown

- The third information item, **pattern injury image or latent image timing rationale / PLTR** is optional. It is a text field of up to 1000 characters used to describe why the **TIM** determination was made.

- The fourth information item, **pattern injury image or latent image location / PLIL** is mandatory. It is the NCIC code (See **Annex D in *ANSI/NIST-ITL 1-2011***) for scars, such as SC CHIN to indicate that the injury is on the chin. If a latent image is not on a body, enter a description of the location, such as "water glass rim"

- The fifth information item is optional. It is the **pattern injury code / PIC** and its value is selected from the CODE column of **Table 1**. This information item is not applicable to latent print images.

- The sixth information item , **pattern injury image or latent image descriptive text / PLDT** is Unicode text of up to 1000 characters that shall be used to describe those **PIC** codes marked as requiring text in **Table 1** for pattern injuries. It may be used to describe latent images.

The guidelines of the American Board of Forensic Odontologists[18] should be followed in the analysis and reporting of pattern injuries that exhibit characteristics that may be consistent with those caused by bite marks.

Table 4
Pattern Injury Codes

Code	Description	Requires Text
	Type of injury (Only one code beginning with 1. may be entered)	
1.1	Abrasion	No
1.2	Artifact	Yes
1.3	Avulsion	No
1.4	Contusion (ecchymosis)	No
1.5	Incision	No
1.6	Laceration	No
1,7	Petechial hemorrhage	No

[18] See Section III of the *American Board of Forensic Odontology Diplomates Reference Manual*. It is available at http://www.abfo.org/id_mark_guidelines.htm

Code	Description	Requires Text
1.8	Other	Yes
1.9	Not specified	No
	Color of the pattern injury (Multiple color codes may be entered – all begin with 2.)	
2.1	Red	No
2.2	Violet	No
2.3	Reddish purple	No
2.4	Bluish purple	No
2.5	Purple	No
2.6	Blue	No
2.7	Green	No
2.8	Dark Yellow	No
2.9	Pale Yellow	No
2.10	Brown	No
2.11	Other color	No
	Surface contour (only one code beginning with 3. may be entered)	
3.1	Flat	No
3.2	Curved	No
3.3	Irregular	No
3.4	Unknown	No
	Shape (only one code beginning with 4. may be entered)	
4.1	Round	No
4.2	Ovoid	No
4.3	Crescent	No
4.4	Diamond	No
4.5	Rectangular	No
4.6	Irregular	No
4.7	Unknown	No
	Tissue characteristics (only one code beginning with 5. may be entered)	
5.1	Fixed	No
5.2	Mobile	No
5.3	Unknown	No
	Underlying structure (multiple codes beginning with 6. are	

Code	Description	Requires Text
	allowed)	
6.1	Bone	No
6.2	Cartilage	No
6.3	Muscle	No
6.4	Unknown	No
	Cause of pattern injury (only one code beginning with 7. and ending with C may be entered; multiple codes ending with S may be entered; only one code ending with U may be entered)	
	Animal	
7.1C	Caused by animal	Yes
7.1S	Suggestive of animal cause	Yes
	Non- Animal	
7.2C	Caused by non-animal organic agent	Yes
7.2S	Suggestive of non-animal organic agent causation	Yes
7.3C	Caused by non-formally living organism	Yes
7.3S	Suggestive of non-formally living organism causation	Yes
7.4C	Caused by other object (e.g. meat tenderizing hammer)	Yes
7.4S	Suggestive of being caused by other object (e.g. meat tenderizing hammer)	Yes
7.5C	Caused by impact	Yes
7.5S	Suggestive of being caused by impact	Yes
	Human bite mark	
7.6C	Caused by self-inflicted biting	Yes
7.6S	Suggestive of self-inflicted biting	Yes
7.7C	Caused by a bite mark from another human being	Yes
7.7S	Suggestive of a bite mark from another human	Yes
7.8C	Caused by an unknown human making a bite	Yes
7.8S	Suggestive of a human bite mark – unknown agent	Yes
	Other	
7.9	Suggestive of a bite mark pattern but no determination made	Yes
7.10	Suggestive of not being caused by a bite but no determination made	Yes
7.11	Not caused by a bite	Yes
7.12	Inconclusive	Yes

Code	Description	Requires Text
7.13	No determination or speculation as to causing agent / unknown	No

Table 57: Type-10 record layout in *ANSI/NIST-ITL 1-2011* is updated to include the following rows:

Table 5
Type-10 record layout addition

Field Number	Mnemonic	Content Description	Cond code	Character			Value Constraints	Occurrence	
				Type	MIn#	Max#		MIn#	Max#
	VIC	**VICTIM**	O					0	1
10.046	VCS	victim current status	M⇑	A	6	8	VCS= Living, Deceased or Unknown	1	1
	VBS	victim body status	D	A	9	10	VBS= Whole or Part	0	1
10.047	**DCO**	**DATA COLLECTION ORGANIZATION**	O	U	1	1000	none	0	1
	PILD	**PATTERN INJURY OR LATENT PRINT DESCRIPTION**	O					0	1
	PLLT	pattern injury or latent print image application lapse time to imaging	O⇑	AN	3	15	Time measure indicator followed by 2 digits. May be concatenated, with larger time units first. Units Y year, M moth, D day, h hour, m minute	0	1
10.048	PLTR	pattern injury or latent print image timing rationale	O⇑	U	1	1000	**none**	0	1
	PLIL	pattern injury or latent print image location	M⇑	U	6	100	Valid NCIC scar codes from **Annex D** if on a body or free text for an object	1	1
	PIC	pattern injury code	M⇑	ANS	3	5	Value from Code column on Table 1	1	1
	PLDT	pattern injury or latent print image descriptive text	D	U	1	*	None	0	1

Part 3

Part 3 updates additional Sections of the *ANSI/NIST-ITL 1-2011* standard that are affected by the addition of the Type-12 record and the update of the Type-10 record.

Part 3, Subpart 1 Additions to Section 3 of *ANSI/NIST-ITL 1-2011*

This Subpart adds normative references to the ANSI/NIST-ITL standard as required by this Supplement.

Add to **Section 3** of the ANSI/NIST-ITL 1-2011 standard:

American Board of Forensic Odontology, *Diplomates Reference Manual*. It is available at http://www.abfo.org/id_mark_guidelines.htm

ANSI/ADA Specification No. 1058, *Forensic Dental Data Set.* It is available at http:webstore.ansi.org

ANSI/ADA Specification No. 1067 *Standard Functional Requirements for an Electronic Dental Record System.* It is available at http:webstore.ansi.org

ANSI/ADA Specification No. 3950, *Designation System for Teeth and Areas of the Oral Cavity.* It is available at http:webstore.ansi.org
This contains the same information as:
ISO 3950:2009 *Dentistry -- Designation system for teeth and areas of the oral cavity.* It is available at http://www.iso.org/

ISO 12052:2006 *Health informatics -- Digital imaging and communication in medicine (DICOM) including workflow and data management*. It is available at http://www.iso.org/
This is also known as:
National Electrical Manufacturers Association (NEMA) PS3 *Digital Imaging and Communications in Medicine (DICOM)*. It is available at http://medical.nema.org/standard.html

Part 3, Subpart 2 Additions to Section 4 of *ANSI/NIST-ITL 1-2011*

This Subpart adds terms and definitions to the ANSI/NIST-ITL standard as required by this Supplement.

Add to **Section 4** of the ANSI/NIST-ITL 1-2011 standard**:**

ADA

The American Dental Association

DICOM

The standard “Digital Imaging and Communications in Medicine”

NEMA

The National Electrical Manufacturers Association

SMT

Acronym for scars, needle marks and tattoos. The category of scar also includes piercings; tattoos also include chemically induced patterns, brandings, and patterned cuttings.

Part 3, Subpart 3 Additions to Section 5.3 of *ANSI/NIST-ITL 1-2011*

In **Section 5.3** of the ANSI/NIST-ITL 1-2011 standard, there is a table listing the record types. This Subpart updates that table and the descriptive section for the Type12 record that follows that table.

Table 3: Record Identifier 12 is update to read: **Dental and Oral Forensics**

Section 5.3.13 is updated to read:

The Type-12 record shall contain and be used to exchange information that may be used to identify persons or verify the identity of an individual using dental or oral characteristics. It is designed to closely correspond to the *ANSI/ADA Specification No. 1058* – using the condition codes from that standard. It also contains the capability to directly include DICOM data and images, in accordance with *ANSI/ADA Specification No. 1067*.

Part 3, Subpart 4 Additions to Annex B of *ANSI/NIST-ITL 1-2011*

Annex B of the ANSI/NIST-ITL 1-2011 standard concerns Traditional encoding of the content of the standard. These are editorial updates.

Table 97 is updated as follows:

Record Identifier	Logical record contents	Type of Data
12	Dental and oral forensics	ASCII/Binary

Annex B Section B.2.8 is updated:

There are no special requirements for this record type.

Part 3, Subpart 5 Additions to Annex C of *ANSI/NIST-ITL 1-2011*

Annex C of the *ANSI/NIST-ITL 1-2011* standard concerns NIEM-conformant encoding rules.
Table 100 Record element tags for the record types is updated with the following:

Record Category Code	Record Element Tag	Logical record contents
12	<itl:PackageDentalRecord>	Dental and Oral forensics

Section C.10.10 Dental record is updated to read:
The XML name for the Type-12 record (Section 8.12) is <itl:PackageDentalRecord> and its <biom:RecordCategoryCode> shall have a value of "12".

Part 3, Subpart 6 Additions to Annex G of *ANSI/NIST-ITL 1-2011*

Annex G of the *ANSI/NIST-ITL 1-2011* standard maps the elements defined in the standard to the NIEM IEPD. This update includes the update to the table for Type-10 and the insertion of a new table for Type-12.

Table 6
Addition to existing Annex G Type-10 Table

Field ID	Mnemonic	XML element name	Cardinality
	TO BE Done		

Table 7
Addition to Annex G for Type-12 Table

Field ID	Mnemonic	XML element name	Cardinality
		itl:PackageInformationRecord	1..1
12.001	-	biom:RecordCategoryCode	1..1
12.002	IDC	biom:ImageReferenceIdentification	1..1
	TO BE Done		

Part 3, Subpart 7

This subpart provides a sample XML instance of the Type-12 record.

```
<?xml version="1.0" encoding="UTF-8"?>

        <!-- ************************************************ -->
        <!--  RECORD TYPE 12     Forensic Dental Record        -->
        <!-- ************************************************ -->
        <itl:PackageForensicDentalDataRecord>
                <!--   12.001  -->
                <biom:RecordCategoryCode>12</biom:RecordCategoryCode>

                <!--   12.002 IDC  -->
                <biom:ImageReferenceIdentification>
                        <nc:IdentificationID>4</nc:IdentificationID>
                </biom:ImageReferenceIdentification>

                <!--   12.200-900 UDF  -->
```

```
<ext:ExampleUserDefinedFields>
        <!-- Well-formed XML goes here.  Users may define a substitute element. -->
</ext:ExampleUserDefinedFields>

<!--   12.901   RESERVED for use by ANSI/NIST-ITL-->

<!--   12.902 ANN  -->
<biom:ProcessAnnotation>
        <!-- GMT  -->
        <biom:ProcessUTCDate>
                <nc:DateTime>2011-11-05T05:25:00Z</nc:DateTime>
        </biom:ProcessUTCDate>
        <!-- NAV  -->
        <biom:ProcessName>A process name</biom:ProcessName>
        <!-- OWN  -->
        <biom:ProcessOwnerText>A process owner</biom:ProcessOwnerText>
        <!-- PRO  -->
        <biom:ProcessDescriptionText>A process description</biom:ProcessDescriptionText>
</biom:ProcessAnnotation>

<!--   12.903-12.992   RESERVED for use by ANSI/NIST-ITL-->

<!--   12.995 ASC  -->
<biom:AssociatedContext>
        <!-- ACN  -->
        <biom:ContextIdentification>
                <nc:IdentificationID>1</nc:IdentificationID>
        </biom:ContextIdentification>
        <!-- ASP  -->
        <biom:BiometricSegmentIdentification>
                <nc:IdentificationID>3</nc:IdentificationID>
        </biom:BiometricSegmentIdentification>
</biom:AssociatedContext>

<!--   12.997 SOR  -->
<biom:SourceRepresentation>
        <!-- SRN  -->
        <biom:SourceIdentification>
                <nc:IdentificationID>1</nc:IdentificationID>
        </biom:SourceIdentification>
        <!-- RSP  -->
        <biom:BiometricSegmentIdentification>
                <nc:IdentificationID>3</nc:IdentificationID>
        </biom:BiometricSegmentIdentification>
</biom:SourceRepresentation>


<biom:DentalData>
        <biom:BiometricCaptureDetail>
                <!--   12.998 GEO  -->
                <biom:CaptureLocation>
                        <!-- GRT  -->
                                <nc:LocationDescriptionText>Corner of Washington and Madison, Geneva,
                        NY</nc:LocationDescriptionText>
                        <!-- ELE  -->
                        <nc:LocationGeographicElevation>
                                <nc:MeasurePointValue>159</nc:MeasurePointValue>
                        </nc:LocationGeographicElevation>
                        <biom:LocationTwoDimensionalGeographicCoordinate>
                                <nc:GeographicCoordinateLatitude>
                                        <!-- LTD  -->
                                        <nc:LatitudeDegreeValue>42</nc:LatitudeDegreeValue>
                                        <!-- LTM  -->
                                        <nc:LatitudeMinuteValue>51</nc:LatitudeMinuteValue>
                                        <!-- LTS  -->
                                        <nc:LatitudeSecondValue>48</nc:LatitudeSecondValue>
                                </nc:GeographicCoordinateLatitude>
                                <nc:GeographicCoordinateLongitude>
                                        <!-- LGD  -->
                                        <nc:LongitudeDegreeValue>76</nc:LongitudeDegreeValue>
                                        <!-- LGM  -->
                                        <nc:LongitudeMinuteValue>59</nc:LongitudeMinuteValue>
                                        <!-- LGS  -->
```

```
                                        <nc:LongitudeSecondValue>24</nc:LongitudeSecondValue>
                                    </nc:GeographicCoordinateLongitude>
                                    <!-- GDC  -->
                                    <!--Note:Only once occurence of GDC is allowed per GEO field) -->

        <!<biom:GeodeticDatumCoordinateSystemCode>WGS84</biom:GeodeticDatumCoordinateSystemCode>-->
                                    <!-
<biom:GeodeticDatumCoordinateSystemName>NAD83</biom:GeodeticDatumCoordinateSystemName>-->
                                </biom:LocationTwoDimensionalGeographicCoordinate>
                                <nc:LocationUTMCoordinate>
                                    <!-- GDC -->
                                    <nc:UTMDatumID>WGS84</nc:UTMDatumID>
                                    <!-- GCE  -->
                                    <nc:UTMEastingValue>337436</nc:UTMEastingValue>
                                    <!-- GCM  -->
                                    <nc:UTMGridZoneID>18N</nc:UTMGridZoneID>
                                    <nc:UTMGridZoneSquareID>WC</nc:UTMGridZoneSquareID>
                                    <!-- GCN  -->
                                    <nc:UTMNorthingValue>4747558</nc:UTMNorthingValue>
                                </nc:LocationUTMCoordinate>
                                <biom:LocationAlternateGeographicSystemValue>
                                    <!-- OSI  -->
                                <biom:GeographicLocationSystemName>LANDMARK</biom:GeographicLocationSystemName>
                                    <!-- OCV  -->
                                    <biom:GeographicLocationText>Hydrant NW31</biom:GeographicLocationText>
                                </biom:LocationAlternateGeographicSystemValue>
                            </biom:CaptureLocation>

                            <!-- 12.005 DCO -->
                            <biom:CaptureOrganization>
                                <nc:OrganizationName>Hurricane XXX Disaster Recovery Team </nc:OrganizationName>
                            </biom:CaptureOrganization>
                        </biom:BiometricCaptureDetail>

                        <biom:SourceOrganization>
                            <!-- 12.004 SRC -->
                            <nc:OrganizationIdentification>
                                <nc:IdentificationID>FL013415Y</nc:IdentificationID>
                            </nc:OrganizationIdentification>
                            <!-- 12.993 SAN -->
                            <nc:OrganizationName>Florida Department of Law Enforcement</nc:OrganizationName>
                        </biom:SourceOrganization>

                        <!-- 12.003 FDS -->
                        <biom:ForensicDentalSettingDetail>
                            <!--FAT-->
                            <biom:ForensicAnalystCategoryCode>M</biom:ForensicAnalystCategoryCode>
                            <!--FPOC-->
                            <nc:OrganizationPrimaryContactInformation>
                                <nc:ContactInformationDescriptionText>Bob Jones, 767-555-1212
                                </nc:ContactInformationDescriptionText>
                            </nc:OrganizationPrimaryContactInformation>
                            <!--FACC-->
                            <biom:SourceCountryCodeISO3166Alpha2Code>US</biom:SourceCountryCodeISO3166Alpha2Code>
                            <!--Examples of other allowed code elements -->
                            <!--
<biom:SourceCountryCodeISO3166Alpha3Code>USA</biom:SourceCountryCodeISO3166Alpha3Code> -->
                            <!--
<biom:SourceCountryCodeISO3166NumericCode>840</biom:SourceCountryCodeISO3166NumericCode> -->

                            <!-- 12.006 SDI -->
                            <biom:DentalDonor>
                                <!-- SIDC -->
                                <biom:DonorStatusCode>1</biom:DonorStatusCode>
                                <!-- SDLC -->
                                <biom:DonorLastContactDate>
                                    <nc:Date>2010-12-25</nc:Date>
                                </biom:DonorLastContactDate>
                                <!-- SDOB -->
                                <nc:PersonBirthDate>
                                    <nc:Date>1953-04-23</nc:Date>
                                </nc:PersonBirthDate>
                                <!-- SEGP -->
```

```
            <nc:PersonEthnicityText>Puerto Rican</nc:PersonEthnicityText>
            <!-- SDRA -->
            <biom:DonorDNARecordsAvailableCode>0</biom:DonorDNARecordsAvailableCode>
            <!-- SCLD -->
            <biom:DonorCollectionLocationDescriptionText>Prison</biom:DonorCollectionLocationDescriptionText>
            <!-- SDTD -->
            <biom:EstimatedDeathDate>
                  <nc:DateTime>2012-01-01T12:56:00</nc:DateTime>
            </biom:EstimatedDeathDate>
</biom:DentalDonor>

<!-- 12.007 OSCI-->
<biom:OriginalForensicDentalEncodingSystemInformation>
            <!-- OSN -->
            <biom:SystemNameCode>FastID</biom:SystemNameCode>
            <!-- OSV -->
            <biom:SystemVersionText>Version 2</biom:SystemVersionText>
            <!-- OCPD -->
            <biom:ToothPermanenceCategoryCode>0</biom:ToothPermanenceCategoryCode>
            <!-- OCRM -->
            <biom:RestorationDataSimplificationCode>11</biom:RestorationDataSimplificationCode>
</biom:OriginalForensicDentalEncodingSystemInformation>

<!-- 12.008 TCSI-->
<biom:SourceForensicDentalEncodingSystemInformation>
            <!-- TCN -->
            <biom:SystemNameCode>PLASS</biom:SystemNameCode>
            <!-- TCV -->
            <biom:SystemVersionText>Version 7.8</biom:SystemVersionText>
            <!-- TCPD -->
            <biom:ToothPermanenceCategoryCode>0</biom:ToothPermanenceCategoryCode>
            <!-- TRCM -->
            <biom:RestorationDataSimplificationCode>11</biom:RestorationDataSimplificationCode>
</biom:SourceForensicDentalEncodingSystemInformation>

<!-- 12.009 FDS -->
<biom:FamilialData>
            <biom:FamilialDataDetail>
                  <!-- FRC  -->
                  <biom:ADAReferenceCodeText>7.1.2</biom:ADAReferenceCodeText>
                  <!-- FDT -->
                  <biom:AdditionalDescriptiveText>Jane</biom:AdditionalDescriptiveText>
            </biom:FamilialDataDetail>
            <biom:FamilialDataDetail>
                  <!-- FRC  -->
                  <biom:ADAReferenceCodeText>7.1.1</biom:ADAReferenceCodeText>
                  <!-- FDT -->
                  <biom:AdditionalDescriptiveText>Smith</biom:AdditionalDescriptiveText>
            </biom:FamilialDataDetail>
</biom:FamilialData>


<!-- 12.010 DHD -->
<biom:DentalHistoryData>
            <biom:DentalHistoryDataDetail>
                  <!-- DHC  -->
                  <biom:ADAReferenceCodeText>8.1.3.9.1.5</biom:ADAReferenceCodeText>
                  <!-- DHT  -->
                  <nc:OrganizationPrimaryContactInformation>
                        <nc:ContactInformationDescriptionText>Jana Champion, 414-382-7500
                        </nc:ContactInformationDescriptionText>
                  </nc:OrganizationPrimaryContactInformation>
            </biom:DentalHistoryDataDetail>
            <biom:DentalHistoryDataDetail>
                  <!-- DHC  -->
                  <biom:ADAReferenceCodeText>8.1.3.8.4</biom:ADAReferenceCodeText>
            </biom:DentalHistoryDataDetail>
</biom:DentalHistoryData>

<!-- 12.011 TDS -->
<biom:ToothData>
            <biom:ToothDataDetail>
                  <!—TDI -->
```

```
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- TNU  -->
                <biom:ToothID>36</biom:ToothID>
                <!-- TOSC  -->
                <biom:OriginalSystemToothEncodingText>amf O</biom:OriginalSystemToothEncodingText>
                <!-- TACC  -->
                <biom:TransmittedToothConditionEncodingText>9.3.2.5.1.3, 9.3.2.5.4.1
                </biom:TransmittedToothConditionEncodingText>
                <!-- TTSC -->
                <biom:TransmittedToothEncodingText>amf O </biom:TransmittedSystemToothEncodingText>
                <!-- TNCI -->
                <biom:ToothIDCertaintyCode>0</biom:ToothIDCertaintyCode>
                <!-- TDT -->
                <biom:AdditionalDescriptiveText>Text field used for those codes that require additional
                description</biom:AdditionalDescriptiveText>
        </biom:ToothDataDetail>
        <biom:ToothDataDetail>
                <!—TDI -->
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- TNU  -->
                <biom:ToothID>36</biom:ToothID>
                <!-- TOSC  -->
                <biom:OriginalSystemToothEncodingText>cef DO</biom:OriginalSystemToothEncodingText>
                <!-- TACC  -->
                <biom:TransmittedToothConditionEncodingText>9.3.2.5.1.3, 9.3.2.5.1.2, 9.3.2.5.4.2
                </biom:TransmittedToothConditionEncodingText>
                <!-- TTSC -->
                <biom:TransmittedSystemToothEncodingText>cef DO
                </biom:TransmittedSystemToothEncodingText>
                <!-- TNCI -->
                <biom:ToothIDCertaintyCode>0</biom:ToothIDCertaintyCode>
                <!-- TDT -->
                <biom:AdditionalDescriptiveText> Text field used for those codes that require additional
                description</biom:AdditionalDescriptiveText>
        </biom:ToothDataDetail>
        <biom:ToothDataDetail>
                <!—TDI -->
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- TNU  -->
                <biom:ToothID>36</biom:ToothID>
                <!-- TACC  -->
                <biom:OriginalSystemToothEncodingText>uif O</biom:OriginalSystemToothEncodingText>
                <!-- TTSC  -->
                <biom:TransmittedToothConditionEncodingText>9.3.2.5.1.2, 9.3.2.5.4.9
                </biom:TransmittedToothConditionEncodingText>
                <!-- TTSC -->
                <biom:TransmittedSystemToothEncodingText>uif O
                </biom:TransmittedSystemToothEncodingText>
                <!-- TDT -->
                <biom:ToothIDCertaintyCode>0</biom:ToothIDCertaintyCode>
                <biom:AdditionalDescriptiveText> Text field used for those codes that require additional
                description</biom:AdditionalDescriptiveText>
        </biom:ToothDataDetail>
</biom:ToothData>

<!-- 12.012 MDS -->
<biom:MouthData>
        <biom:MouthDataDetail>
                <!—MDD -->
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- MRC  -->
                <biom:ADAReferenceCodeText>10.3.2.4.1.1</biom:ADAReferenceCodeText>
                <!-- MDT -->
                <biom:AdditionalDescriptiveText> Text field used for those codes that require additional
                description</biom:AdditionalDescriptiveText>
```

```
        </biom:MouthDataDetail>
        <biom:MouthDataDetail>
                <!—MDD -->
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- MRC  -->
                <biom:ADAReferenceCodeText>10.5.1.1.8.1</biom:ADAReferenceCodeText>
        </biom:MouthDataDetail>
</biom:MouthData>

<!-- 12.013 VIS -->
<biom:DentalImageData>
        <biom:DentalImageDataDetail>
                <!—VID -->
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- VIG  -->
                <biom:VisualImageCaptureLocation>
                        <nc:LocationDescriptionText>Corner Madison and 54th</nc:LocationDescriptionText>
                </biom:VisualImageCaptureLocation>
                <!-- VIRC  -->
                <biom:ADAReferenceCodeText>11.2.1.1</biom:ADAReferenceCodeText>
                <!-- VIDT -->
                <biom:AdditionalDescriptiveText> Text field used for those codes that require additional
                description</biom:AdditionalDescriptiveText>
                <!-- VIER -->
                <biom:SourceExternalFileReferenceText>https://www.localpdname.case54/image3.jpg
                </biom:SourceExternalFileReferenceText>
        </biom:DentalImageDataDetail>
        <biom:DentalImageDataDetail>
                <!—VID -->
                <biom:CaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                <biom:CaptureDate>
                <!-- VIG  -->
                <biom:VisuallImageCaptureLocation>
                        <nc:LocationDescriptionText>41° 50’ 9” N  91° 52’ 0” W
                        </nc:LocationDescriptionText>
                </biom:VisualImageCaptureLocation>
                <!-- VIRC  -->
                <biom:ADAReferenceCodeText>11.2.2.1</biom:ADAReferenceCodeText>
                <!-- VIDT -->
                <biom:AdditionalDescriptiveText>Front upper lip retracted, bottom lip missing, lower jaw broken
                and only partially present</biom:AdditionalDescriptiveText>
                <!-- VIDD -->
                <nc:BinaryBase64Object>mrHbPdrko3u1s7ahtgPBjtmO1s85tfG2U7bpofY9
                        4Czu2SbY7d7wF9fQ7ZptgGrtkO2a2dsJ7wZbe
                        8BlzvAmQ7xq+Y94GoHeEsR3ikWd4DIGhzmp3k42
                        d4DRmzs94DKveDTB3hqw6PeBLrtpPep0H/+h</nc:BinaryBase64Object>
                <!-- VIER -->
                <biom:SourceExternalFileReferenceText>External file URL/URI where the dental data is
                located</biom:SourceExternalFileReferenceText>
        </biom:DentalImageDataDetail>
</biom:DentalImageData>

<!-- 12.014 RIDS -->
<biom:RadiographicImageData>
        <biom:RadiographicImageDataDetail>
                <!-- RGS  -->
                <biom:ADAReferenceCodeText>12.5.3</biom:ADAReferenceCodeText>
                <!-- RIS  -->
                <biom:ADAReferenceCodeText>12.6.4.2.1</biom:ADAReferenceCodeText>
                <!-- RIIS  -->
                <biom:AdditionalDescriptiveText> right</biom:AdditionalDescriptiveText>
                <!-- RICD  -->
                <biom:RadiographCaptureDate>
                        <nc:Date>2012-01-01</nc:Date>
                </biom:RadipgraphCaptureDate>
                <!-- RPI  -->
                <nc:OrganizationPrimaryContactInformation>
                        <nc:ContactInformationDescriptionText>Jana Champion, 414-382-7500
```

```
                                        </nc:ContactInformationDescriptionText>
                                </nc:OrganizationPrimaryContactInformation>
                                <!-- RIER -->
                                <biom:SourceExternalFileReferenceText>https://www.localpdname.case54/image3.jpg
                                </biom:SourceExternalFileReferenceText>
                        </biom:RadiographicImageDataDetail>
                        <biom:RadiographicImageDataDetail>
                                <!-- RGS  -->
                                <biom:ADAReferenceCodeText>12.5.3</biom:ADAReferenceCodeText>
                                <!-- RIS  -->
                                <biom:ADAReferenceCodeText>12.6.4.2.1</biom:ADAReferenceCodeText>
                                <!-- RIIS  -->
                                <biom:AdditionalDescriptiveText> left</biom:AdditionalDescriptiveText>
                                <!-- RID  -->
                                <biom:CaptureDate>
                                        <nc:Date>2012-01-01</nc:Date>
                                </biom:CaptureDate>
                                <!-- RPI  -->
                                <nc:OrganizationPrimaryContactInformation>
                                        <nc:ContactInformationDescriptionText>Jana Champion, 414-382-7500
                                        </nc:ContactInformationDescriptionText>
                                </nc:OrganizationPrimaryContactInformation>
                                <!-- RIDD -->
                                <nc:BinaryBase64Object>mrHbPdrko3u1s7ahtgPBjtmO1s85tfG2U7bpofY9
                                        4Czu2SbY7d7wF9fQ7ZptgGrtkO2a2dsJ7wZbe
                                        8BlzvAmQ7xq+Y94GoHeEsR3ikWd4DIGhzmp3k42
                                        d4DRmzs94DKveDTB3hqw6PeBLrtpPep0H/+h</nc:BinaryBase64Object>
                        </biom:RadiographicImageDataDetail>
                </biom:RadiographicImageData>

                <!-- 12.015 NEMA  -->

                <biom:DicomData>
                        <!-- DIV -->
                        <biom:SystemVersionText>2011</biom:SystemVersionText>
                         <!-- DRD -->
                        <biom:DataRetrievalDate>
                                <nc:Date>2012-01-01</nc:Date>
                        </biom:DataRetrievalDate>
                        <!-- DICD -->
                                <nc:BinaryBase64Object>mrHbPdrko3u1s7ahtgPBjtmO1s85tfG2U7bpofY9
                                4Czu2SbY7d7wF9fQ7ZptgGrtkO2a2dsJ7wZbe
                                8BlzvAmQ7xq+Y94GoHeEsR3ikWd4DIGhzmp3k42
                                d4DRmzs94DKveDTB3hqw6PeBLrtpPep0H/+h</nc:BinaryBase64Object>
                        <!-- DER -->
                        <biom:SourceExternalFileReferenceText>https://www.localpdname.case54/image3.jpg
                        </biom:SourceExternalFileReferenceText>
                </biom:DicomData>
                <!--12.016 -019 RESERVED for use by ANSI/NIST-ITL -->
                <!--12.020 COM-->
                <biom:CommentText>may contain comments of any type on the Type 12 record as a whole</biom:CommentText>

                <!--  12.021-199   RESERVED for use by ANSI/NIST-ITL-->
        </biom:DentalData>
</itl:PackageForensicDentalDataRecord>
```

Part 4

This Part of the Supplement concerns the use of the new Type-12 record, the new data elements in Type-10 and other existing record types in the *ANSI/NIST-ITL 1-2011* standard for the purpose of identifying unknown deceased. It does not address the Standard Operating Procedures for obtaining forensic and biometric data or the matching processes involved in making an identity determination.

An *ANSI/NIST-ITL 1-2011* conformant transaction is centered around a single individual. For the case of an unknown deceased, the concept is to match data acquired post-mortem with information retrieved from various sources that was collected while the person was alive. It may be necessary to compare post-mortem samples and data with antemortem information for several different individuals. Even then, a positive identification may not be possible. A correlative situation exists for living amnesiacs, except that the current biometrics samples are collected while the person is still alive and compared to data associated with missing persons.

Subpart 1 deals with the unknown individual, whether unknown deceased or living amnesiac. Subpart 2 deals with handling images of suspected bite marks or suspected latent lip print images.

It should be noted that although the record contains antemortem information items concerning the purported identity of an individual, the forensic dentist is not ordinarily on a position to verify that those antemortem records are correct.

Part 4 Subpart 1 Unknown Deceased and Living Amnesiacs

There are various categories of data that are included in the ANSI/NIST-ITL 1-2011 standard that may substantially assist the forensic analyst in identification of unknown individuals, such as those shown in the following table. This is not an exhaustive list, but is only meant to serve as an introduction to the possibilities available. Only certain key data elements in the record types are illustrated. Note that it is possible to combine several instances of the same record type and several different record types in a single transaction.

Table 8
Sample Forensic Uses of ANSI/NIST-ITL

Type of data	ANSI/NIST-ITL 1-2011 data element	Subject		Relative
		Prior	Current	
Face image				
Drivers license	Type 10, **IMT** = FACE, **SAP** = 10	✓		
Mugshot (arrests)	Type-10, **IMT** = FACE, **SAP** = 20 or higher	✓		
Passport photo	Type-10, **IMT** = FACE, **SAP** = 13	✓		
Other photos	Type-10, **IMT** = FACE, **SAP** = 0	✓		

Posed photo	Type-10, **IMT** = FACE, **SAP** = 30 or higher	✓	✓	
3D forensic markup of image	Type-10, **IMT** = FACE, **SAP** = dependent upon source image, **3DF** points selected as appropriate	✓		
3D forensic markup of image of reconstructed face	Type-10, **IMT** = FACE, **SAP** = 0, **3DF** points selected as appropriate		✓	
Distinguishing body characteristic				
Tattoo	Type-10, **IMT** = TATTOO, **SMS = tattoo size**	✓	✓	
Disfigured, (missing right, etc.) forearm)	Type-10, **IMT** = body part chosen from **Table 58**, such as RIGHT ARM	✓	✓	
DNA				
From subject	Type-18, **DSD** – 0		✓	
From belongings supposed to be from subject	Type-18, **DSD** = 2	✓		
From claimed or purported relative	Type-18, **DSD** = 1, **COPR** = claimed relationship, **PED** = relationship in pedigree tree			✓
Dental				
Images and data form forensic analysis of the decedent	Type-12, **SIDC** = 1		✓	
Data from prior dental treatment	Type-12, **SIDC** = 0	✓		
Friction ridges				
Images of fingerprints	Type-4 or Type-14	✓	✓ (if alive)	
Images of palm prints	Type-15	✓	✓ (if alive)	
Images of plantar prints	Type-19	✓	✓ (if alive)	
Images of friction ridge prints from decedent	Type-13		✓	
Associated images				
Jewelry, etc.	Type-21	✓		

Part 4 Subpart 2 Criminal Investigation

For cases involving possible bite marks on a person or latent images of possible perioral origin on a person, a Type-10 record should be used to transmit the image and associated data in a transaction associated with the victim. For cases involving images or casts of impressions of possible perioral or intraoral origin on an object, data should be transmitted in a Type-21 record. If a cast is made of the impressions on the object, the location where that cast is stored and a description of it should be transmitted in a Type-21 record.

Since a transaction is person-centric, the images of the victim and of the crime scene (including possible bite marks in objects) may be contained in a single transaction. The dental and oral data for comparison from a possible candidate should be contained in a separate transaction. It is possible to cross-reference these transactions by using fields in Record Type-1. **Field 1.009 Transaction control number / TCN** from one transaction may be entered in **Field 1.010 Transaction control reference / TCR** in subsequent transactions.

Most implementation domains have also established specific values for **Field 1.004 Type of transaction /TOT** to indicate how the transmitted information is to be used – such as for a search in a database or direct comparison against the data from another transaction.

For cheiloscopic analysis, it may be useful to include information in **Field 10.029 2D facial feature points / FFP** indicating the position of certain features of the lips, using the points shown in **Figure 14** of the *ANSI/NIST-ITL 1-2011* standard, as defined in *ISO/IEC 14496-2*. Any cheiloscopic categorization should be stated in **Field 10.032 Comment / COM**, including the categorization system used (such as Suzuki and Tsuchihashi classification[19]). Forensic markups of latent images on a person shall be contained in a Type-10 record associated with that individual. Forensic markups of images of a possible candidate shall be contained in a Type-10 record in a transaction associated with that candidate.

[19] K. Suzuki and Y. Tsuchihashi, *A new attempt of personal identification by means of lip print*, Can. Soc. Forensic Sci. J. 4 (1971)